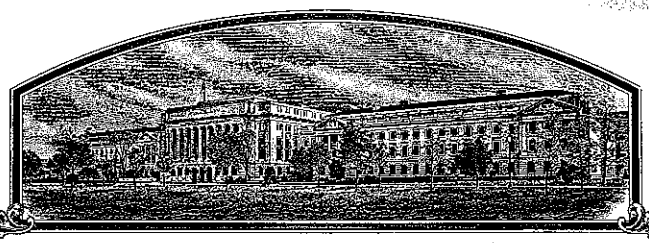
No. 200400303



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

North Carolina Agricultural Research Service

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE [illegible]HT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR [illegible]TING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE [illegible]PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE [illegible]OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT [illegible] THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) [illegible]OLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMB[illegible]ERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'NC-Neuse'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of Washington, D.C. this fourth day of February, in the year two thousand and five.*

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

[illegible] Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
North Carolina Agricultural Research Serv.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
NC96-13156

3. VARIETY NAME
NC-Neuse

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Box 7643, N.C. State Univ., Raleigh
NC 27695-7643

5. TELEPHONE *(include area code)*
919-515-2718

6. FAX *(include area code)*
919-515-7745

FOR OFFICIAL USE ONLY

PVPO NUMBER
20 0400 303

FILING DATE
September 7, 2004

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
State Government Agency

8. IF INCORPORATED, GIVE STATE OF INCORPORATION

9. DATE OF INCORPORATION

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Dr. Myron Fountain, Director
North Carolina Foundation Seed Producers, Inc.
8220 Riley Hill Rd.
Zebulon, NC 27597

FEES RECEIVED
FILING AND EXAMINATION FEES: $ 3652.00 DATE 9/07/2004
CERTIFICATION FEE: $ 432.00 DATE 12/07/2004

11. TELEPHONE *(Include area code)*
919-269-5592

12. FAX *(Include area code)*
919-269-5593

13. E-MAIL
myron_fountain@ncsu.edu

14. CROP KIND *(Common Name)*
Wheat

16. FAMILY NAME *(Botanical)*
Poaceae

15. GENUS AND SPECIES NAME OF CROP
Triticum aestivum

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☒ NO

18. DOES THE VARIETY CONTAIN ANY TRANSGENES? *(OPTIONAL)*
☐ YES ☒ NO
IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERICALIZATION. _____

19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED
(Follow instructions on reverse)

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of Variety
d. ☒ Exhibit D. Additional Description of the Variety *(Optional)*
e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☒ Filing and Examination Fee ($3,652), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act)*
☒ YES *(if "yes", answer items 21 and 22 below)* ☐ NO *(if "no", go to item 23)*

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES?
☒ YES ☐ NO
IF YES, WHICH CLASSES? ☒ FOUNDATION ☐ REGISTERED ☒ CERTIFIED

22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☒ NO
IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS.
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☒ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
Myron Fountain / Paul Murphy (mF)			
NAME *(Please print or type)*		NAME *(Please print or type)*	
Myron			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
NC Foundation Director, Seed Producers, Inc	Sep 2, 2004		

(See reverse for instructions and information collection burden statement)

20 04 00 303

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $3,652 ($432 filing fee and $3,220 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvpindex.htm

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 http://www.ams.usda.gov/lsg/seed.htm.

ITEM

19a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) Identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

20. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

23. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

24. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

22. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

Foundation and Certified class, No Registered class

23. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

Certified seed sold Sep 9, 2003

24. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

—

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

Exhibit A.
Origin and Breeding History
NC-Neuse Wheat

Pedigree:

NC-Neuse wheat, formally designated NC96-13156, was derived from the cross Coker 86-29//'Stella'/CHD 756-80/3/'Coker 9907'.

Stella (CI*tr* 17937) is a soft red winter wheat germplasm line developed by Purdue University and it contains the *H9* and *H10* genes for resistance to Hessian Fly [*Mayetiola destructor* (Say)].

CHD 756-80 is a Polish winter wheat of unknown pedigree that expressed resistance to powdery mildew (caused by *Blumeria graminis* DC. f. sp. *tritici* Em. Marchal) in field evaluations in North Carolina.

Coker 86-29 is a Coker Pedigreed Seed Company (now Syngenta) breeding line with the pedigree VA75-57-53//'H-McNair 2003'/'Coker 68-15'/3/Coker 79-14. It was not released as a variety.

Coker 9907 (PI 548847, PVP 9100143) is a Coker Pedigreed Seed Company (now Syngenta) cultivar with the pedigree 'Coker 762'/4/'Abe'/3/Coker 68-15*3//CItr 13836/8*'Chancellor'. CI*tr* 13868 is a source of the *Pm*1 gene for resistance to powdery mildew.

Selection and Multiplication:

NC-Neuse was developed using a combination of the mass selection and pedigree breeding methods. The final cross was made in the greenhouse in 1989. Bulk F_2 seed was harvested from F_1 plants in June 1991 at the Central Crops Research Station, Clayton, NC. The F_2 and F_3 generations underwent mass selection at the Tidewater Research Station, Plymouth, NC during the 1991-92 and 1992-93 seasons. Each season a single 11.1 m^2 plot was sown with a bulk of approximately 1700 seeds. One hundred large heads with a bright yellow or cream color were selected at maturity. Selected heads were threshed in bulk and a sample of seed was planted the following season. Procedures were similar in the F_4 generation grown at Clayton during the 1993-94 season except selected heads were threshed separately and one meter $F_{4:5}$ head-rows were planted at Plymouth in the 1994-95 season. Selection in head-rows was based on winter survival, time of head emergence, plant height, straw strength, overall plant vigor, and reaction to natural inoculum of powdery mildew and leaf rust [caused by *Puccinia triticina* (Eriks)]. This protocol was repeated during the 1995-96 season on $F_{5:6}$ head-rows. A single $F_{5:6}$ head-row selection, designated NC96-13156, was harvested.

Observed Characters:

NC96-13156 was evaluated in a non-replicated observation nursery in the 1996-97 season and replicated multilocation trials in 1997-98 and 1998-99. It was evaluated in the North Carolina (Table 1) Official Variety Tests in 2000, 2001, 2002 and 2003, and in the South Carolina (Table 2) and Georgia (Table 3) Official Variety Tests in 2001, 2002 and 2003. It was evaluated throughout the soft red winter wheat region in the USDA-

ARS Uniform Southern Soft Red Winter Wheat Nursery in 2000-01 (Tables 4 and 5). It was evaluated in the Uniform Southern Fusarium Head Blight Screening Nursery in 2001 (Table 6). Milling and baking quality evaluations were conducted on grain samples bulked across locations from the 2001, 2002 and 2003 NC Official Variety Tests (Table 6).

Multiplication, Purification and Variants:

Fifty $F_{8:9}$ head selections of NC96-13156 were grown during the 1998-99 season and a single uniform head-row that was true-to-type was harvested to produce Breeder seed. This material underwent seed increase during the 1999-00 and 2000-01 seasons. In Fall 2001, 82 kg of $F_{8:12}$ Breeder seed was transferred to the North Carolina Foundation Seed Producers, Inc. Although NC-Neuse has remained uniform and stable in composition since 1999, the Breeders seed increase fields in 2002 and 2003 contained up to 0.5% plants 10-15cm taller than NC -Neuse and up to 0.1% plants with awned spikes.

Exhibit B.
Statement of Distinctness
NC-Neuse Wheat.

NC-Neuse wheat is uniquely different from all known cultivars. In comparison to wheat cultivars with which it has been evaluated, NC-Neuse is most similar to Roane (PI 612598, PVP 200000148) in heading date, plant stature, and test weight (Table 1). NC-Neuse possesses genes *Lr* 9, *Lr* 10 and *Lr* 11 governing resistance to leaf rust (*Puccinia triticina*), while Roane possesses only *Lr* 11. When evaluated under natural infection in North Carolina during the 2000 - 2003 seasons NC-Neuse was significantly more resistant than Roane (2 versus 6 on a scale of 0 = immune and 9 = highly susceptible) (Table 1). The major genes conferring resistance to powdery mildew (*Blumeria graminis*) in NC-Neuse and Roane have not been identified. However, during the 2000-2003 seasons, NC-Neuse exhibited an immune reaction (0) and Roane a susceptible reaction (7) to naturally occurring isolates of the fungus in North Carolina (on a scale of 0 = immune and 9 = highly susceptible) (Table 1). In controlled environment tests conducted by the USDA-ARS on the campus of Purdue University seedlings of NC-Neuse were susceptible, while seedlings of Roane were resistant, to Biotype B of Hessian Fly [*Mayetiola destructor* (Say)].

NC-Neuse produces significantly more straight grade flour than Roane (67.8% versus 63.1%, respectively) (Table 7). NC-Neuse produces flour that is more suitable for cookie and cake production whereas Roane produces flour more suitable for cracker production (Table 7). NC-Neuse has a significantly lower value than Roane for alveograph overpressure (29.5 versus 44.0), and significantly higher values than Roane for alveograph extensibility (121 versus 80) and cookie spread (83.1 versus 73.3).

Table 1. Mean performance of NC-Neuse in the NC Official Variety Test, during the 2000, 2001, 2002 and 2003 Seasons

Entry	Grain Yield	Test weight	Heading date	Plant height	Lodging	Powdery mildew	Leaf rust	Hessian fly
	bu/ac	lb/bu	April	in.	%	(0-9)[a]	(0-9)[b]	%[c]
SS 522	70	58.7	15	35	25	6	1	15
AGS 2000	70	58.7	9	35	24	5	5	.
USG 3209	70	56.8	11	32	19	1	9	35
NC-Neuse	68	58.7	16	34	11	0	2	5
26R61	66	59.0	12	38	8	5	3	3
SS 550	65	56.7	14	34	31	1	6	38
SS 566	65	57.1	15	36	9	2	1	34
26R24	65	56.8	13	35	40	5	5	38
Roane	65	59.0	17	33	11	7	6	18
2691	65	57.2	7	33	18	1	4	31
SS 518	65	57.0	15	33	49	1	4	44
Sisson	64	57.3	11	33	30	2	5	38
Patton	64	57.2	14	36	4	6	1	24
SS 520	64	56.7	13	36	26	0	8	38
26R38	64	56.7	13	35	13	6	6	6
Coker 9663	63	57.8	9	37	15	7	7	40
2580	62	56.8	13	36	17	4	4	43
Coker 9835	60	56.4	11	31	15	7	6	28
2684	58	58.1	9	36	19	0	8	20
Jackson	54	57.2	16	36	46	6	9	.
Mean	64	57.5	12	35	21	3	5	27
LSD (0.05)	7	1.1	4	2	16	2	2	14
CV%	11	2	17	6	75	24	31	36
No. loc/yrs	9	9	3	3	9	1	1	1

[a]0 = Immune, 9 = fully susceptible.

[b]0 = Immune, 9 = fully susceptible.

[c]Percent infested tillers.

Table 2. Mean Performance of NC-Neuse in the South Carolina Variety Performance Trials at Florence during the 2001, 2002 and 2003 Seasons

Entry	Grain Yield	Test weight
	bu/ac	lb/bu
26R38	65	54.2
26R24	62	53.6
NC-Neuse	59	56.8
26R61	59	56.9
USG 3209	57	53.0
AGS 2000	57	54.9
SS 520	56	54.1
Coker 9835	56	53.7
Coker 9184	55	57.3
SS 566	53	53.8
SS 522	50	56.4
Coker 9663	41	55.2
Mean	56	55.4
LSD (0.10)	7	1.4
CV%	10.6	1.7

Table 3. Mean Performance of NC-Neuse in the North Georgia Variety Performance Trials at Griffin during the 2001, 2002 and 2003 Seasons

Entry	Grain Yield
	bu/ac
26R24	89
USG 3209	83
SS 520	82
AGS 2000	79
26R61	79
Coker 9663	79
Coker 9152	78
Tribute	77
NC-Neuse	76
Crawford	76
Mean	78
LSD (0.10)	5
CV%	.

Table 4. Grain Yield of NC-Neuse and Check Cultivars in the 2000-01 Uniform Southern Soft Red Winter Wheat Nursery

	Belle Mina AL bu/ac	Bay AR bu/ac	Dewitt AR bu/ac	Keiser AR bu/ac	Quincy FL bu/ac	Griffin GA bu/ac	Plains GA bu/ac	Aberdeen ID bu/ac	Greenburg IN bu/ac	Winfield KS bu/ac
NC-Neuse	53	70	50	58	69	73	105	105	99	63
Coker 9835	58	63	52	59	68	73	100	108	76	71
Coker 9663	55	68	57	64	59	76	106	99	97	66
Mason	57	65	57	58	66	66	98	100	88	59
AGS 2000	66	64	69	68	74	83	108	108	81	50
Mean N=43	55	67	57	59	66	71	102	93	90	59
LSD (0.05)		13.6	8.9	8.3	11.7	8.5	9.7	13.6		6.8
CV%		10	7.7	8.7	10.9	7.4	5.9	10.6		6.7

	Hopk'sville KY bu/ac	Logan Co. KY bu/ac	B' Rouge LA bu/ac	Q'town MD bu/ac	P'ville MO bu/ac	Cleveland MS bu/ac	Wooster OH bu/ac	Clemson SC bu/ac	Florence SC bu/ac	Knoxville TN bu/ac
NC-Neuse	76	84	77	81	46	66	83	66	71	53
Coker 9835	72	90	88	97	52	70	70	65	68	61
Coker 9663		77	85	93	53	73	83	53	53	58
Mason	81	81	70	92	52	69	84	67	63	71
AGS 2000	93	69	71	86	57	87	77	58	79	66
Mean N=43	82	86	77	87	51	71	76	61	63	62
LSD (0.05)	9.8	16.7		9.1	10.2	9	6.5	9.7	8.8	10.7
CV%	5.9	11.6		6.5	12.3	6.4	5.3	9.9	8.8	10.6

	Overton TX bu/ac	Prosper TX bu/ac	Blacksburg VA bu/ac	Warsaw VA bu/ac	Means all Locs. bu/ac
NC-Neuse	70	45	57	63	70
Coker 9835	64	47	79	55	71
Coker 9663	68	38	97	55	71
Mason	58	41	68	54	69
AGS 2000	76	56	71	61	74
Mean N=43	64	42	72	58	69.5
LSD (0.05)	7.1	7.7		8.5	
CV%	8.2	18		10.8	

Table 5. Mean performance of NC-Neuse and Check Cultivars for Agronomic and Disease Resistance Characteristics in the 2000-01 Uniform Southern Soft Red Winter Wheat Nursery

	All Locations Mean Test Weight lbs / bu (Rank)	All Locations Mean Heading Date Julian (Rank)	All Locations Mean Plant Height Inches (Rank)	All Locations Mean Lodging (0-9)
NC-Neuse	59.1 (5)	117 (38)	32 (34)	1.3
Coker 9835	56.6 (33)	116 (35)	31 (39)	0.8
Coker 9663	58.3 (12)	115 (25)	36 (4)	2.2
Mason	56.6 (34)	113 (5)	35 (11)	1.3
AGS 2000	58.5 (8)	114 (14)	34 (15)	1.4

	Powdery Mildew 8 Locations (0-9)	Leaf Rust 3 Locations %	Leaf Rust Beeville, TX IT	Leaf Rust St. Paul, MN IT	Stem Rust St. Paul, MN IT	Stripe Rust 2 Locations (0-9)
NC-Neuse	1.3	8.3	MR	TR	TR-MR	2.5
Coker 9835	3.1	28.0	R	TR	TR	3.5
Coker 9663	3.2	10.6	R	TR	TR	1.7
Mason	3.7	10.3	R	TMS-S	30MS-S	2.5
AGS 2000	3.3	1.7	MR	TR	10MR-MS	2.7

	BYDV 2 Locations (0-9)	SBMV Winfield, KS (0-9)	WSSV 2 Locations (1-9)
NC-Neuse	3.0	2	5.7
Coker 9835	4.0	2	2.8
Coker 9663	2.5	6	3.0
Mason	5.8	7	2.9
AGS 2000	4.5	9	5.6

Table 6. Mean performance of NC-Neuse and Check Cultivars in the 2001 Uniform Southern Fusarium Head Blight Screening Nursery. 'Rank' indicates a cultivars standing among all 29 test entries.

CULTIVAR/ DESIGNATION	FHB Incidence (0-100)	RANK	FHB Severity (0-100)	RANK	FHB Index (0-100)	RANK	Scabby Seed %	RANK	Vomitoxin DON (ppm)	RANK	Greenhse Type 2 (0-100)	RANK
ERNIE	32	1	13	1	7	1	18	2	6.6	7	25.7	2
COKER 9835	74	29	47	28	43	29	53	29	11.6	15	71.2	26
COKER 9474	40	3	19	4	10	2	16	1	3.3	2	31.4	3
MCCormick	48	7	19	5	12	5	23	7	6.0	6	38.8	7
Tribute	45	5	26	16	15	11	21	4	4.3	3	48.7	14
NC-Neuse	56	20	20	8	16	12	26	11	7.9	10	47.3	13
Mean (N=29)	53		27		20		31		11		52.2	
L.S.D. (0.05)	13		10		12		14		8.7		21.2	
C.V. (%)	23.9		27.3		51.5		34.1		62.4		28.8	
No. Locations	6		7		5		5		4		4	

Table 7. Mean Milling and Baking Quality Performance of NC-Neuse in the NC Official Variety Test in the 2001, 2002 and 2003 Seasons.

Entry	Test Wt.	Grain Prot.	Fall. No.	Grain Vom.	Pat. Fl.	St. Gr. Fl.	Fl. Prot.	Fl. F. No.	Fl. Vom.	Bran Prot.	Farinograph Fl. Absor.	Farinograph Dev. Time	Farinograph Stab. Time	Farinograph MTI	Farinograph Break. Time
	lb/bu	%	s	ppm	%	%	%	s	ppm	%	%	m	m	bu	m
AGS 2000	59.1	11.3	335	1.6	46.1	64.8	9.4	344	1.2	14.7	54.2	1.6	3.6	82	4.3
Coker 9184	60.6	11.2	332	1.1	51.9	69.8	9.5	352	0.8	15.1	54.7	1.8	2.9	113	3.7
Coker 9663	58.8	10.6	313	2.8	45.8	63.8	8.9	326	1.2	14.2	55.7	1.9	2.6	111	3.3
Crawford	58.8	10.9	303	1.4	47.6	65.2	8.8	306	1.3	14.2	56.2	1.7	2.4	115	3.3
NC-Neuse	60.5	11.4	367	0.7	48.9	67.8	9.7	360	0.3	14.5	55.4	2.0	2.5	122	3.2
P 26R24	58.9	10.8	298	0.8	46.4	64.3	9.3	344	0.6	13.3	56.4	1.8	2.3	112	3.3
P 26R38	58.0	10.6	299	1.3	46.9	64.7	9.1	302	1.0	13.5	53.4	2.4	4.0	59	4.8
P 26R61	59.7	12.1	338	2.1	47.3	65.4	9.9	341	1.3	15.2	54.0	2.1	4.8	63	5.5
Patton	58.3	11.3	329	1.2	47.8	65.4	9.2	290	0.7	15.2	55.5	1.7	2.9	108	3.7
Roane	60.2	10.9	357	1.8	46.8	63.1	9.0	352	0.7	14.1	55.7	1.9	2.7	104	3.6
SS 520	57.9	10.4	325	2.1	49.2	67.2	8.8	335	0.9	14.0	52.8	1.7	2.5	94	3.3
SS 522	60.4	10.8	336	2.7	44.7	63.6	9.0	336	2.0	13.6	55.4	1.8	2.8	88	3.4
SS 550	59.1	11.2	386	1.7	47.5	65.0	9.1	377	0.6	14.7	54.9	1.6	3.1	100	3.8
TRIBUTE	59.9	10.8	347	2.0	45.0	63.1	8.4	344	0.6	14.0	55.2	1.4	2.6	98	3.3
USG 3209	58.0	11.0	378	1.7	46.6	63.5	9.0	372	0.7	14.4	56.4	1.7	3.3	84	4.1
Mean	59.2	11	336	1.7	47.2	65.1	9.1	339	0.9	14.3	55.1	1.8	3.0	96.8	3.8
LSD (0.05)	1.2	0.7	50	ns	ns	3.5	0.6	39	ns	0.9	ns	ns	ns	29.6	ns
CV%	1.2	3.8	8.8	80.3	4.8	3.2	3.8	6.9	79.4	3.6	2.5	29.1	30.4	18.3	21.9
Quality Goal															
Pastry Fl.	>58	9-11.5	>350	<2	50-60	>63	8.0-10	>350	<1	>13	51-55	>2.0	2.0-4	80-140	2.5-3.5
Cracker / Ex.	>58	10.0-15	>350	<2	50-60	>63	9.0-14	>350	<1	>13	52-56	>2.5	3.0-7	80-140	2.5-3.5

Laboratory evaluations conducted on 5,000 gram samples by Mike Pate, MidState Mills, Newton, NC.

Table 7. Mean Milling and Baking Quality Performance of NC-Neuse in the NC Official Variety Test in the 2001, 2002 and 2003 Seasons.

	Alveograph				
Entry	Over Pres.	Exten	Curve Con.	Alveo Work	Cookie Spread.
	mm	mm	O/E	J	cm
AGS 2000	35.6	129	0.28	134.7	77.7
Coker 9184	37.4	108	0.35	109.7	83.6
Coker 9663	40.1	94	0.47	111.3	84.5
Crawford	40.9	73	0.61	85.7	76.9
NC-Neuse	29.5	121	0.25	99.0	83.1
P 26R24	47.8	102	0.49	126.7	76.6
P 26R38	33.0	153	0.22	143.7	83.7
P 26R61	37.4	164	0.24	169.3	79.3
Patton	29.1	90	0.33	74.0	78.0
Roane	44.0	80	0.55	110.3	73.3
SS 520	30.8	137	0.26	115.3	81.6
SS 522	43.5	100	0.52	127.3	80.8
SS 550	35.7	76	0.49	84.0	78.4
TRIBUTE	58.1	78	0.87	149.7	75.7
USG 3209	50.1	101	0.51	144.3	72.9
Mean	39.5	107	0.43	119.0	79.1
LSD (0.05)	8.0	32	0.26	27.1	5.8
CV%	12.1	17.7	36.6	13.6	4.4
Quality Goal					
Pastry Fl.	24-38	90-170	0.24-0.45	70-127	86-92
Cracker / Ex.	>30	>150	0.24-0.45	>127	NA

Laboratory evaluations conducted on 5,000 gram samples by Mike Pate, MidState Mills, Newton, NC.

REPRODUCE LOCALLY. Include form number and date on all reproductions.

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(*Wheat*)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S): N.C. Agricultural Research Service

ADDRESS (*Street and No. or RD No., City, State, and Zip Code*):
Box 7643, Patterson Hall
N.C. State University
Raleigh, NC 27695-7643

FOR OFFICIAL USE ONLY

PVPO NUMBER: 20 0400 303

VARIETY NAME: NC-Neuse

TEMPORARY OR EXPERIMENTAL DESIGNATION: NC96-13156

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [0][9][9] or [0][9]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used:
Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1] 1=Common 2=Durum 3=Club 4=Other (SPECIFY) : _____

2. VERNALIZATION:

[2] 1=Spring 2=Winter 3=Other (SPECIFY) : _____

3. COLEOPTILE ANTHOCYANIN:

[1] 1=Absent 2=Present

4. JUVENILE PLANT GROWTH:

[2] 1=Prostrate 2=Semi-erect 3=Erect

5. PLANT COLOR (boot stage):

[2] 1 = Yellow-Green 2 = Green 3 = Blue-Green

6. FLAG LEAF (boot stage):

[1] 1 = Erect 2 = Recurved [2] 1 = Not Twisted 2 = Twisted

7. EAR EMERGENCE:

[0][1] Number of Days Earlier Than Roane *

[0][5] Number of Days Later Than USG 3209 *

15

8. ANTHER COLOR:

[1] 1 = Yellow 2 = Purple

9. PLANT HEIGHT (from soil to top of head, excluding awns):

[0][5] cm Taller Than USG 3209 *

[1][0] cm Shorter Than Pioneer 26R61 *

* Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

10. STEM:

A. ANTHOCYANIN

[1] 1= Absent 2=Present

B. WAXY BLOOM

[2] 1=Absent 2=Present

C. HAIRINESS (last internode of rachis)

[2] 1=Absent 2=Present

D. INTERNODE (SPECIFY NUMBER)

[1] 1= Hollow 2=Semi-solid 3=Solid

E. PEDUNCLE

2 [1] 1=Absent 2=Present per letter of 10/12/04 MAH 11/22/2004

[ ] cm Length

11. HEAD (at Maturity):

A. DENSITY

[2] 1=Lax 2=Middense 3= Dense

B. SHAPE

[1] 1 = Tapering 2= Strap 3 = Clavate 4 = Other (SPECIFY): _____

C. CURVATURE

[2] 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS

[3] 1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned

12. GLUMES (at Maturity):

A. COLOR

[1] 1 = White 2 = Tan

3 = Other (SPECIFY) : _____

B. SHOULDER

[2] 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK

[1] 1 = Obtuse 2 = Acute 3 =Acuminate

D. LENGTH

[3] 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

12. GLUMES (at Maturity) *Continued*:

20 04 00 303

E. WIDTH

[2] 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE

[1] 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK

[1] 1=Rounded 2=Angular

C. BRUSH

[3] 1=Short 2=Medium 3=Long

[1] 1 = Not Collared 2 = Collared

D. CREASE

[1] 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[3] 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

E. Color

[3] 1=White 2= Amber 3= Red
4= OTHER (Specify)

G. PHENOL REACTION *(see instructions)*:

[ ] 1 = Ivory 2 = Fawn
3 = Light Brown 4 = Dark Brown
5 = Black

F. TEXTURE

[2] 1=Hard 2=Soft

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[3] Stem Rust *(Puccinia graminis* f. sp. *tritici)*
Mixture Races, St Paul, MN

[1] Stripe Rust *(Puccinia striiformis)*
Natural Inoculum Arkansas

[0] Tan Spot *(Pyrenophora tritici-repentis)*

[0] Halo Spot *(Selenophoma donacis)*

[3] *Septoria nodorum* (Glume Blotch)

[0] *Septoria avenae* (Speckled Leaf Disease)

[0] *Septoria tritici* (Speckled Leaf Blotch)

[3] Scab (*Fusarium* spp.)
Natural Inoculum, NC

[2] Leaf Rust *(Puccinia recondita* f. sp. *tritici)*
TLGF

[0] Loose Smut *(Ustilago tritici)*

[0] Flag Smut *(Urocystis agropyri)*

[0] Common Bunt *(Tilletia tritici* or *T. laevis)*

[0] Dwarf Bunt *(Tilletia controversa)*

[0] Karnal Bunt *(Tilletia indica)*

[2] Powdery Mildew *(Erysiphe graminis* f. sp. *tritici)*
Natural Inoculum, NC and VA

[0] "Snow Molds"

14. Disease *(Continued)* (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[0]	"Black Point" (Kernel Smudge)	[0]	Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.*)*
[3]	Barley Yellow Dwarf Virus (BYDV) Natural Inoculum, NC	[0]	Rhizoctonia Root Rot *(Rhizoctonia solani)*
[3]	Soilborne Mosaic Virus (SBMV) Natural Inoculum, GA	[0]	Black Chaff *(Xanthomonas campestris* pv. *translucens)*
[1]	Wheat Yellow (Spindle Streak) Mosaic Virus Natural Inoculum, GA	[0]	Bacterial Leaf Blight *(Pseudomonas syringae* pv. *syringae)*
[0]	Wheat Streak Mosaic Virus (WSMV)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

[2]	Hessian Fly *(Mayetiola destructor)* Biotypes C	[ ]	Other (SPECIFY)
[0]	Stem Sawfly *(Cephus* spp.)	[ ]	Other (SPECIFY)
[1]	Cereal Leaf Beetle *(Oulema melanopa)*	[ ]	Other (SPECIFY)
[0]	Russian Aphid *(Diuraphis noxia*	[ ]	Other (SPECIFY)
[0]	Greenbug *(Schizaphis graminum)*	[ ]	Other (SPECIFY)
[0]	Aphids	[ ]	Other (SPECIFY)

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

Exhibit D.
Optional Supplemental Information
NC-Neuse Wheat.

Test weight, milling and baking quality of NC-Neuse are excellent. In the Uniform Southern Nursery in 2000-01, NC-Neuse ranked fifth out of 42 test entries for test weight over all locations (Table 5). Over four seasons of testing in the NC Official Variety Test, NC-Neuse displayed a significantly greater test weight than USG 3209, SS566, 26R24, Patton, 2580 and Coker 9835 (Table 1). NC-Neuse produces significantly more straight grade flour yield than Coker 9663, SS 522, Tribute and USG 3209 and significantly higher cookie diameter than Crawford, 26R24, Tribute and USG 3209 (Table 7).

NC-Neuse exhibited low levels of infestation by Hessian fly at three location-years in North Carolina in the 2000-01 and 2001-02 seasons. Mean tiller infestation (8%) was significantly lower than the susceptible Coker 9663 (30%) and similar to the resistant 26R61 (3%). Examination of the biotype composition in North Carolina during this period found Biotype L (66%) and Biotype D (19%) were predominant. Nevertheless, four controlled environment tests were inconclusive with respect to the identification of major genes with resistance to Biotype L in NC-Neuse. NC-Neuse was identified as resistant to Biotype C and susceptible to Biotype D.

NC-Neuse exhibited a moderate level of resistance to Fusarium Head Blight (FHB) [caused by *Fusarium graminearum* Schwabe, Group II (anamorph)] (Table 6). Mean head severity over seven locations for NC-Neuse (20%) was significantly better than the susceptible Coker 9835 (47%) and not significantly different than the moderately resistant Ernie (13%) in the Uniform Southern FHB nursery in 2000-01. Similar results were observed for scabby seed percentage. Vomitoxin levels in NC-Neuse (7.9 ppm) and Ernie (6.6 ppm) were not significantly different.

REPRODUCE LOCALLY. Include form number and edition date on all reproductions. FORM APPROVED - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued *(7 U.S.C. 2421)*. The information is held confidential until the certificate is issued *(7 U.S.C. 2426)*.

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
North Carolina Agricultural Research Serv.	NC96-13156	NC-Neuse
4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	**5. TELEPHONE** *(Include area code)*	**6. FAX** *(Include area code)*
Box 7643, N.C. State University., Raleigh NC 27695-7643	919-515-2718	919-515-7745
	7. PVPO NUMBER	200400303

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain.** [X] **YES** [ ] **NO**

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? **If no, give name of country.** [XX] **YES** [ ] **NO**

10. Is the applicant the original owner? [XX] **YES** [ ] **NO** **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?
[ ] **YES** [ ] **NO** **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?
[ ] **YES** [ ] **NO** **If no, give name of country**

11. Additional explanation on ownership *(Trace ownership from original breeder to current owner. Use the reverse for extra space if needed)*:

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.